IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : George A. Provost et al. Art Unit : 1771
Serial No. : 10/728,138 Examiner : Jenna-Leigh Befumo
Filed : December 3, 2003
Title : NEEDLING THROUGH CARRIER SHEETS TO FORM LOOPS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF JAMES R. BARKER

I, James R. Barker, declare as follows:

1. I received a Bachelor of Science degree from Clarkson College of Technology (now Clarkson University) in Mechanical Engineering in 1979. I have been employed by the Velcro companies since May, 2004 in their research and development department. Prior to that I was plant manager for Knowlton Nonwovens in Troy, New Hampshire from 2002 to 2004, and before that was VP of Operations for Troy Mills, Inc., also in Troy, New Hampshire, from 1994 to 2004. I have 12 years of experience pertaining to nonwovens, fiber webs and needling processes.

2. In the course of the development work that led to the invention claimed in the above-referenced application, we observed that the use of forked needles is beneficial to reduce the tendency of many carrier sheets to tear when pierced. Because the carrier sheet is more punctured than torn, as shown in Figs. 2A and 2B of our specification the carrier sheet is able to support the base of the loop structures after the needles have been retracted. As recited in our amended claims, the carrier sheet forms projections extending out of a general plane of the

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I hereby certify under 37 CFR §1.8(a) that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage on the date indicated below and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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carrier sheet at the holes, the projections bearing against fibers passing through the holes. As a result, as discussed at page 19, lines 5-13 of our specification, the trunks of the loop structures are supported by the carrier sheet about the hole, a phenomenon we refer to as "turtlenecking." The vertical stiffness thus imparted to the trunks acts to resist permanent crushing or flattening of the loop structures, which can occur when the loop material is spooled or when the finished product to which the loop material is later joined is compressed for packaging. Resiliency of the trunk, especially at its juncture with the base, can enable loop structures that have been "toppled" by heavy crush loads to right themselves when the load is removed.

3. We also observed that these projections of the carrier sheet could not be reliably obtained using barbed needles, commonly referred to in the textile field as felting needles. This is in part because barbed needles have a tendency to tear the carrier sheet. However, without wishing to be bound to theory, Applicants believe that the observed poorer performance is also due to elongation of the holes during needling with barbed needles. Because barbed needles have barbs which are typically at least 4-6 mm from the tip, approximately 4-6 mm penetration is needed before the barbs begin to carry fibers through the carrier sheet. Thus, barbed needles tend to have a long dwell time in the carrier sheet (the time that the needle resides in the hole in the carrier sheet). The carrier sheet is moving laterally in a continuous needling process, and thus the holes are elongated by dragging the needles laterally within the hole.

4. Forked needles tend to have less distance (typically no distance) from the tip to the fork, and thus each millimeter of needle penetration is a millimeter of effective penetration of the fibers through the carrier sheet. As a result, the effective dwell time of the needles in the carrier sheet can be minimized, minimizing elongation of the holes due to lateral movement of the carrier sheet while the needles are in the holes. Applicants believe that the minimal elongation of the holes allows the claimed projections to be formed, supporting the trunks of the loop structures.

5. The different cross-sections of forked needles (which have a substantially round cross-section) and barbed needles (which have a triangular cross-section) may also play a role in the "turtlenecking" phenomenon. Again without wishing to be bound by theory, we believe that the round cross-section may tend to prevent tearing of the carrier sheet and produce a cleaner puncture.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Date: 7-25-06

James R. Barker

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